1. test 2A

(1) $|x - |x+2|| < x$

(a) $x+2 \geq 0$

$\boxed{x \geq -2}$

$|x - x - 2| < x$

$\boxed{2 < x}$

(b) $x+2 < 0$

$\boxed{x < -2}$

$|x + x + 2| < x$

$|2(x+1)| < x$

(b.1) $x+1 \geq 0$

$x \geq -1$

nelze

(b.2) $x+1 < 0$

$\boxed{x < -1}$

$-2x - 2 < x$

$-2 < 3x$

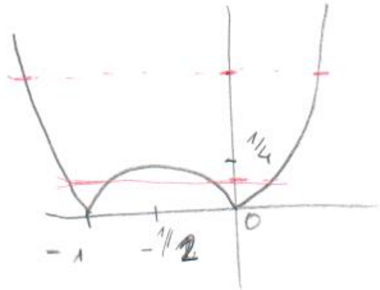
$\boxed{-\frac{2}{3} < x}$

nelze

Závěr $x \in (2, \infty)$

(2) $|x^2+x| > a$

- pro $a < 0$ $\qquad x \in \mathbb{R}$



- $x^2+x=0$

$x(x+1)=0 \qquad x_1=0 \qquad x_2=-1$

(a) $x^2+x \geq 0$

$x \in (-\infty,-1] \cup [0,\infty)$

$x^2+x > a$

$x^2+x-a > 0$

$$x_{1,2} = \frac{-1 \pm \sqrt{1+4a}}{2}$$

(b) $x^2+x < 0$

$x \in (-1,0)$

$-x^2-x > a$

$0 > x^2+x+a$

$$x_{1,2} = \frac{-1 \pm \sqrt{1-4a}}{2}$$

hm, ani $1-4a \geq 0$

$\frac{1}{4} \geq a$

(1) $a<0: x \in \mathbb{R}$

(2) $a=0: \qquad x \in \mathbb{R} \setminus \{-1,0\}$

(3) $a \in (0, \frac{1}{4})$ $\qquad x \in \left(-\infty, -\frac{1}{2} - \frac{\sqrt{1+4a}}{2}\right) \cup \left(-\frac{1}{2} + \frac{\sqrt{1+4a}}{2}, \infty\right)$

$\cup \left(\frac{-1-\sqrt{1-4a}}{2}, \frac{-1+\sqrt{1-4a}}{2}\right)$

(4) $a = \frac{1}{4}$ $\qquad x \in \left(-\infty, -\frac{1}{2} - \frac{\sqrt{2}}{2}\right) \cup \left(\frac{-1+\sqrt{2}}{2}, \infty\right) \cancel{\cup \{\tfrac{1}{2}\}}$

(5) $a > \frac{1}{4}$ $\qquad x \in \left(-\infty, \frac{-1-\sqrt{1+4a}}{2}\right) \cup \left(\frac{-1+\sqrt{1+4a}}{2}, \infty\right)$

(3) $f(x,y,z) = \arctan(xy) + \sin(x+yz)$

$$\frac{\partial f}{\partial x} = \frac{1}{1+(xy)^2} \cdot y + \cos(x+yz)$$

$$\frac{\partial f}{\partial y} = \frac{1}{1+(xy)^2} \cdot x + \cos(x+yz) \cdot z$$

$$\frac{\partial f}{\partial z} = \cos(x+yz) \cdot y$$